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ABSTRACT

It is the purpose of this guide to provide established, well-tested guidelines for planning and constructing food service facilities. These guidelines attempt to get the most efficient and economical operation from a school's food service facilities by providing pertinent information for expanding and remodeling existing facilities, as well as planning and constructing new food service centers. General space requirements are listed for food service centers according to level and size of school. Specific guidelines concern the sanitation and space requirements for food storage, preparation, and serving; dishwashing; and waste disposal. Specifications are provided for the placement and performance of kitchen equipment. (Author/MLF)

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A Guide for Planning and Construction of Public School Facilities in Georgia

School Food Service Facilities

A GUIDE FOR PLANNING AND CONSTRUCTION OF PUBLIC SCHOOL FACILITIES IN GEORGIA

This publication is printed as a series of booklets. Titles included in the series are listed below.

Laws, General Policies and Procedures

Site Selection and Development

General Design and Construction Standards and Sanitation Design Criteria

Heating, Ventilating, Air Conditioning, Electrical and Lighting

Early Childhood and Elementary General Purpose Instructional Units

Middle School, Junior High and Senior High General Purpose Instructional Units

Administrative and Support Services Facilities

Media Center Facilities

Fine Art and Music Facilities

Auditoriums, Little Theater, Speech and Drama Laboratory

School Food Services Facilities

Science Facilities

Physical Education Facilities

Vocational Facilities I – Home Economics and Distributive Education

Vocational Facilities II – Industrial Arts and Business Education

Vocational Facilities III – Trade and Industrial

Vocational Facilities IV – Agriculture

Specialized Instructional Units

Other Specialized Instructional Units

Furnishings and Equipment

A Guide for Planning and Construction of Public School Facilities in Georgia

Office of Administrative Services
Local Systems Support Division
School Plant Services
Georgia Department of Education
Atlanta, Georgia 30334

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Jack P. Nix
State Superintendent of Schools
1976

School Food Service Facilities

FOREWORD

Careful, long-range planning of school food service facilities is essential to effective operation. After construction is complete, the ability of these facilities to meet the students' needs is permanently built into the school plant. Because expanding and/or remodeling food service facilities can be both expensive and complicated, most food service centers will be used as originally planned for many years.

The school food service center that is designed to provide a pleasant atmosphere, that minimizes the institutional environment, is attractive, well lighted, well ventilated and well equipped can be a valuable public relations center for the school.

It is the purpose of this guide to provide established, well-tested guidelines for planning and constructing food service facilities. These guidelines attempt to get the most efficient and economical operation from a school's food service facilities by providing pertinent information for expanding and remodeling existing facilities, as well as planning and constructing new food service centers.

CONTENTS

Foreword 2

General Policies
- Interaction of facilities 3
- School food service educational program 3
- Types of services 3
- Role of the system food service supervisor 3
- Location of food service center 4
- Functional flow chart 5
- Selection of equipment 5

Physical Plant
- General space requirements 6
- Dining area 7
- Serving area 7
- Kitchen area 8
- Office area 9
- Dry storage room 9
- Kitchen storage 10
- Loading platform 10
- Refuse area 10
- Mechanical garbage disposal 10
- Storage for cleaning supplies 11
- Refrigerated storage 11
- Employee lounge 12

Design
- Contract considerations 12
- Doors 12
- Windows 12
- Interior finishes 12
- Bulletin boards 13
- Drinking fountains 13
- Dish return 13
- Scullery requirements 14
- Rinse injector 15
- Electronic detergent dispenser 15
- Lighting and electrical outlets 15
- Floor drains 15
- Mechanical ventilation 15

Equipment
- Equipment placement and use 16
- Steam equipment 17
- Portable equipment 17
- Large equipment list 17

GENERAL POLICIES

Interaction of Facilities

When planning the school food service center, consideration must be given to its location in respect to other components of the school plant. Preferably, the location should occupy a central location within the design layout. Provisions for isolating the area for special evening activities may be desirable. When properly planned and located, the food service center usually serves additional school and community activities. Other important planning considerations include space allotment, anticipated growth, the selection and location of equipment and the educational program.

School Food Service Educational Program

Opportunities exist in the school food service program to teach nutrition, acceptable social behavior, suitable conversation, respect for others, self reliance, cleanliness, broader food experience, better eating habits and expression of gratitude. The food service center may be used to supplement and enrich instruction in other areas of curriculum.

Types of Services

Food services in Georgia schools may involve a type "A" plate lunch, breakfast and special milk. The lunch consists of a meat or meat alternate, vegetable and/or fruit, bread, butter and milk.

Middle schools and secondary schools are encouraged to offer a choice of two to four menus each day. One popular choice is a chef's salad bowl or fruit salad plate, which meets type "A" regulations and another is hot meat sandwich, french fries and a salad.

The breakfast pattern includes fruit juice or fruit, meat or meat alternate, bread or cereal and milk.

The content of type "A" helps to assure nutritional adequacy at a minimum cost. Cafeteria type service provides for efficient and sanitary operations with flexibility for scheduling. In secondary schools, consideration should be given to providing space and connections for movable counters for flexibility.

Role of the System Food Service Supervisor

The system food service supervisor should participate in the early planning sessions for any school project in which these facilities are involved, providing information and making suggestions pertinent to food service in the new or renovated building. This supervisor and/or other parties in the system must decide which, if any, food service equipment is to be included in the general contract and advise the architect accordingly. All the necessary information for all equipment to be in the general contract should be given to the architect at this time, including, at a minimum, the following.

- Kind of item required and brand name, if standardization is desired
- Size or capacity
- Quantity required for present and future
- Any special conditions or material preferences

When preliminary plans and specifications are complete, the system food service supervisor should review these documents with other interested parties, including the area school food service consul-

tant of the state department of education, if possible.

When equipment is contracted directly by the system, the system, through its food service supervisor or other system personnel, as decided and agreed by all parties involved, should be responsible for the following.

- The selection and/or coordination of selection of food service equipment with the architect.
- Preparation, in coordination with the architect, of an adequate list of food service equipment and specifications for this equipment to be submitted for approval with "check set" drawings and specifications to the State School Plant Services.
- Cooperation with the architect in obtaining food service equipment manufacturer's literature necessary for the coordination and preparation of working drawings, showing all roughing-in dimensions for all electrical, gas and water connections, electrical characteristics and any other pertinent information. This material and information must be acquired and furnished to the architect in time for the use of the architect and his consultants in preparing working drawings.
- Checking equipment for condition, performance and compliance with project specifications.

Other information that the system food service supervisor must convey to the architect and/or other parties follows.

- Type of food service (lunch, breakfast, special milk)
- Type of offerings (multiple menus and choices available)
- Hours of service (all day, one hour or other)
- Special areas such as senior areas or instructional areas
- Serving counter arrangement (cashier, milk box location)

The system supervisor, in cooperation with the architect and equipment representative, should make sure food service personnel understand and properly operate all equipment.

Specifications for the general contract or separate contract must require manufacturers of equipment to furnish at least two copies of operating manuals for each piece of equipment supplied and a briefing of the system supervisor and managers in the use and care of equipment by representatives of the manufacturer.

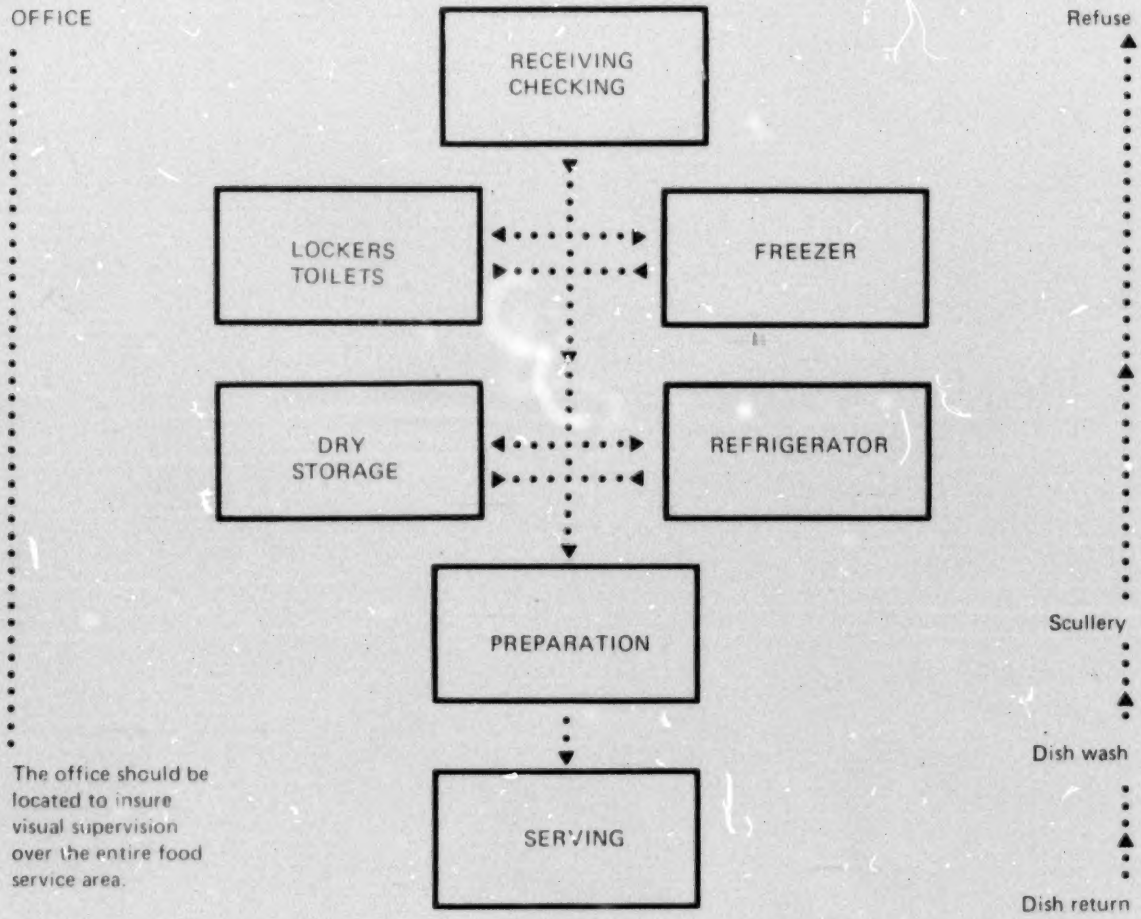
The system food service supervisor and school food service staff of the Georgia Department of Education are available as resource persons and should be consulted in planning school food service centers and selecting equipment.

Location of Food Service Center

The food service center of any school should be located on ground level with the receiving and disposal areas accessible to service area drives. Service drives should be separated from bus, public and student traffic and away from play areas. The dining area should be readily accessible, and located so that lines to serving counters can be within the dining space. Other considerations should include noise transmission to other areas of the school, independent use of the facilities by the public, insect proofing and special requirements for lighting and ventilating.

Functional Flow Chart

In preparing and serving school meals there are several separate processes involved. The following flow chart illustrates the relationship of the different areas.



Selection of Equipment

- *Quality* – Quality equipment should always be specified for food services. Cheap equipment becomes expensive because of rapid deterioration.

  Stainless steel is required for sinks, counter tops, work tables and clean and soiled dish tables. For these purposes, 14 gauge, #4 finish, 18-8 or type 302 stainless steel is recommended.

  In writing specifications, trade names may be used as a standard of quality. Any departure from this standard, as well as what credit will be allowed for substitution, should be clearly stated in the bid.

- *Service* – Repair and maintenance service available on mechanical equipment may determine its acceptability.

- *Standards* – Standards which have been established by various agencies should be incorporated in equipment specifications. Equipment meeting these standards is identified by a seal of approval. Agencies selected by the Georgia Board of Education having the best sets of standards are as follows.

  National Sanitation Foundation (standards one through eight, 12, 18, C-1 and C-2)
  2355 W. Stadium Blvd.
  Ann Arbor, Mich. 48106

  American Gas Association–gas equipment

  Underwriters Laboratories–electrical equipment

  American Society of Mechanical Engineers–steam equipment

- *Standardization* – The problems of procurement and service are simplified by limiting the number of makes of equipment. When this is done, service charges per unit are usually less.

PHYSICAL PLANT

General Space Requirements for Food Service Centers

The following should be used for preliminary space allotment.

- *Kitchen area* – The necessary kitchen space can only be determined accurately by making a functional layout. Equipment to be used and traffic aisles needed should serve as determining factors. Use 1½ square feet per person served where 500 or more meals are served.

  Kitchens designed to serve fewer than 500 meals will require more space per meal served. For kitchens under this capacity, confer with Georgia Department of Education Food Service consultant for appropriate size, layout and possible expansion provisions.

- *Dry storage area* – 250 square feet plus one-third square foot for each meal over 500.

- *Refrigeration-freezer storage* – one-half square foot per meal served. (one-fourth square foot cooler and one-fourth square foot freezer) This does not include reach-in refrigerators and/or freezers.

- *Office space* – 48 to 65 square feet

- *Employee lounge and toilet* – 100 square feet for each sex as needed

- *Janitor's supply storage* – 40 square feet

- *Loading dock* – 50 to 80 square feet

- *Refuse area* – 64 square feet minimum, one-tenth square foot per meal served

- *Assembly/dining area* – five square feet times Average Daily Attendance – minimum size 750 square feet. Junior high and high schools should have shelves provided for books. If dining area is not to be used for assemblies see paragraph *Dining Area.*

- *Large equipment needed* – See attached *Recommended Large Equipment List*

Note: *Space requirements may vary with the kind of equipment purchased and its placement.*

- *Space chart* – The following may be used as examples for the preliminary allotment of space.

	Elementary	Junior High	Senior High	
Maximum enrollment	720	1,200	1,500	
School lunch participation (percentage)	90	80	80	
Approximate number meals	648	960	1,200	
Number serving counters	2	2	3	
Serving rate per minute	20	20	30	
Dining room seating capacity	270	320	400	
Area in square feet				Approximate Percent of Total
Per seat	10	12	12	
Dining area (stage excluded)	2,700	3,840	4,800	59
Kitchen (including dishwashing and refrigeration)	972	1,440	1,800	21
Serving area	400	520	725	7
Office	60	60	60	1
Employees' lounge	150	200	200	4
Refuse area	80	96	120	2
Dry storage	295	388	460	6
Total	4,657	6,544	8,165	
Approximate net area	4,600	6,500	8,200	
Cafetorium (in lieu of dining-stage excluded)	3,600	6,000	7,500	
Total	8,200	12,500	15,700	

Dining Area

Plans should be made to seat at least one-third of the school's Average Daily Attendance in the dining area at one time. All students can then eat in three shifts. In actual practice the lunch period is likely to be scheduled on a staggered rather than a shift basis. For space calculations the effect is the same. When the dining area is not to be used for assemblies, allow 10 to 12 square feet per seat. In general, 10 square feet should be allowed for elementary schools and 12 square feet for middle schools, junior and senior high schools.

Serving Area

Serving areas should generally be separated from the dining area by a full-height partition, or completely portable serving equipment should be provided. Storage for such portable equipment should be available in the kitchen or adjacent areas.

Serving areas in which all or part of the equipment is fixed should provide a minimum of four feet in the work aisle and three feet minimum clearance at ends of either fixed or portable equipment. The arrangement may vary according to the system's preference. Trays and silver are located as the first item in the line, or immediately following the cashier. Hot items, cold items and milk should be served in that order. The cashier may be at either end of line or at a portable stand suitably located to serve this purpose. Tray racks, silver service and milk sections may also be portable.

In elementary schools, the tray rails may be omitted from serving counter. Instead, trays can be handed directly to the child after being filled by food service personnel.

Offering such multiple menus as cold plates calls for refrigerated areas within serving counters and special lights on counters for keeping foods hot and making them attractive.

The current trend in counter dish storage is toward portable shelves or bins stored under the serving counter. This necessitates leaving the space under the serving counter clear at the point where initial serving occurs. Additional dish storage space should be provided.

In order to use the dining area for other purposes, the serving counter should be separated from the dining room by a full partition. Doors in this partition should be equipped with locks for kitchen security. An alternative would be to have serving counters on casters, with storage space provided in the kitchen or an adjacent area.

Kitchen Area

Space allocation chart (see page nine)

Meals served	**Square footage**
75 to 100	300 – 500
150 to 250	400 – 600
250 to 350	500 – 700
350 to 500	600 – 900
Over 500	1½ per person served

A rectangular kitchen of good porportions is usually the best arrangement.

Aisle allowances should be planned as follows.

- Between oven equipment and work tables – four feet
- Traffic aisles – 3½ to four feet
- Traffic aisles where utility trucks are used – four feet
- Between front of refrigerator and other equipment – 3½ feet
- Between two work tables – 3½ to four feet

Clearing space between equipment and walls or between pieces of equipment should be provided. (See Standard No. 4, p. 21, and *Manual on Installation of Food Service Equipment,* National Sanitation Foundation.)

Office Area

A desk, file and work space must be provided for managers of all food service units. A separate office containing 50 or more square feet of floor space is desirable in departments serving 200 or more students.

This space must be ventilated, and air conditioning is recommended.

The office should be equipped with a desk, two chairs, a file, an adding machine and a waste basket. A telephone connection is required.

Dry Storage Room

Storage space required depends on purchasing policies, location of the school, delivery service and whether or not central storage is available.

Minimum dry storage recommendations are as follows.

Minimum size	100 square feet
200 – 500 meals	100 square feet plus one-half square foot for each meal in excess of 200 meals served
Over 500 meals	250 square feet plus one-third square foot for each meal in excess of 500 meals served

Most dry storage rooms should be planned with shelving around the perimeter walls with provision for either a single row or double row of sturdy 25-inch by 34-inch portable pallets, with either the 34-inch dimension (single) or the joint between 34-inch units (double) centered on the long axis of the room. Clearance above the top of the portable pallet should be sufficient for five cases of number 10 cans (approximately 40 inches) with shelves above pallets. Aisle space between wall shelving and island shelving and/or pallet area should be three feet. Regular wall shelving should be 18 inches wide and be supported at a maximum spacing of 39 inches clear in multiples of 13 inches. Clear vertical spacing should be 18 inches minimum with the top shelf no more than 92 inches from the floor. A movable ladder should be furnished for access to upper shelves.

One-fourth of the bottom tier of the wall shelving should provide vertical clearance for either a 55-gallon or a 40-gallon standard garbage can *on casters* as required by the system.

Some modification of this arrangement will most likely be necessary for the very small or very large dry storage room. These special installations should be carefully worked out with the system food service supervisor.

Dry storage rooms should not be heated, nor should any heat-producing equipment such as water heaters, compressors, electrical panels, refrigerators, freezers or water piping be located here.

Air conditioning or other means of positive fresh air ventilation must be used to provide at least four air changes per hour. Sturdy, screened louvers used with gravity ventilators in ceilings are preferred over windows as a means of fresh air intake, because of better security and prevention of sunlight damage. Precautions must be taken to prevent freezing of stored goods. Shelving should have approximately two inches clearance from walls to allow air to circulate.

The keying of food storage room locks should be apart from the master system for control.

Kitchen Storage

Portable storage in the form of pan racks, cooling racks, utensil racks and other such items are recommended for saving floor space, table work space and providing a compact, highly efficient kitchen plan. Space above equipment, such as cook's tables and work tables should be utilized for racks storing appropriate utensils or supplies.

Loading Platform

Provide a loading platform approximately eight feet by 10 feet at the same level as the kitchen floor. Larger schools should have a truck dock with bumpers approximately 42 inches above the paved service yard. Insect screening is not needed in this area.

Refuse Area

The refuse area should be convenient to the scullery and preparation areas, as well as to the service yard.

Space must be provided for an adequate number of garbage cans, baskets, crates, cartons, tin cans and other such items.

A permanent rack for drying mops should be installed in this area.

An area roughly three feet by 2½ feet should be provided in this area for washing garbage containers. This area of the floor should be depressed four inches below the level of the other floor and equipped with a minimum three-inch floor drain. A combination hot and cold mixing faucet to a hose bib with a vacuum breaker, designed to prevent freezing, should also be included. The hose bib should be located high enough to clear the garbage cans.

Floor spray and/or step-on type can washers may be considered.

The refuse area should be protected from flying insects and from such animals as rats and dogs. The area should be screened visually from the public entrances to the school plant, but readily accessible to delivery and refuse pick-up trucks.

Consideration should be given to using trash and garbage dumpsters. If this type of service is available or is anticipated in the future, provisions should be made for a concrete pad for this container, which would keep the container and the area around it clean. A floor drain is recommended in the pad. Its size must meet local requirements or codes for draining rainwater into the sewage disposal system. The container should be located within hose reach of the combination mixing faucet in the wash area and convenient to the service drive.

Food service laws and regulations should be met in designing this area.

Mechanical Garbage Disposal

Garbage disposal units may be located where plates are scraped and pre-rinsed, where garbage is generated in the food preparation area and where vegetables are peeled—in place of a peel trap. While these units add to the original equipment cost, they reduce labor and the need for other garbage-handling equipment and space. If garbage disposal units are used, applicable code requirements must be met.

Refuse compactors should be considered as an integral part of the dish-return and scullery areas and

the total refuse disposal plan.

Storage for Cleaning Supplies

A separate, well ventilated area should be provided for storing dry mops, brooms, buckets, cleaning compounds and drums.

Provide a shelf or small cupboard near the sink for storing detergents, scouring powders and brushes. Linens, aprons and uniforms should be stored in separate cabinets or shelves.

A service sink with a vacuum breaker must be provided near cleaning storage.

Refrigerated Storage

The need for walk-in refrigeration equipment is determined by the frequency of deliveries available, volume of food handled and the savings effected by bulk purchases.

Some advantages of walk-in refrigeration are immediate bulk storage space for crates, hampers, baskets and boxes that reach-in refrigerators will not accommodate. Also, mobile equipment may be transferred from refrigeration to preparation areas without loading.

Disadvantages of walk-in refrigeration are that the location is generally less convenient and much of the refrigerated space is not usable.

The rule of thumb for sizing walk-in refrigeration is one-fourth to one-half square foot for each meal served per day. Allocate one half of this space to a freezer at minus five degrees Fahrenheit and one half to a cooler at 35 degrees Fahrenheit.

Walk-in refrigerators may be the sectional, prefabricated type or may be built in as part of the building contract. They should have vermin-proof insulation on walls, floor and ceiling. Glazed tile is preferred for the interior finish.

The floor should be sloped to drain to the door, and the floor level must permit the use of portable racks, trucks or carts. A floor drain should be provided on the outside for cleaning and condensate. A coved juncture is required between the floor and the wall. A minimum of 10 footcandles of lighting should be provided in all areas. Self-contained, plug-in refrigeration units are now available which may be shipped to the manufacturer for repairs. Portable, adjustable shelving is recommended. The solid or louvered type is required (not wire type).

Six to 6½ feet is regarded as the optimum width for walk-in refrigerators. This provides 18 inches of storage space on either side and a three-foot passage. Other dimensions will depend on the size of the school and menus served. More space must be provided where breakfast and special milk programs are anticipated.

Combination reach-in walk-in refrigerators are available. Light weight, plastic doors or foam doors in attractive colors are also available. These can be handled more easily than cumbersome, heavy doors. They are available in thicknesses of four to 10 inches.

If walk-in freezers are not provided, add approximately one-half cubic foot per meal served extra storage space for frozen food cabinets. The needs will depend on the purchasing practices of the school.

Employee Lounge

An employee lounge containing a minimum of 40 square feet shall provide a compartmented water closet, a lavatory with soap dispenser and towel holder, mirror, shelf, first aid cabinet, hanging space for street clothes and uniforms and lockers for each employee. The ultimate determining factor for space is the number and sex of employees.

DESIGN

Contract Considerations

It is generally advisable to include all fixed items of equipment that require plumbing connections, electrical connections (other than low voltage, plug-in items), mechanical connections to duct work or any other equipment fastened to ceilings, walls or floors in the construction contract. This simplifies coordination and establishes responsibility. Cost comparisons of various contractural options should always be studied before final decisions for purchasing equipment are made.

The architect-engineer team and the local system must coordinate efforts and reach joint decisions in all such matters in a manner similar to that described in the subsection entitled *Role of the System Food Service Supervisor* under General policies.

Care must be exercised by all parties involved that all features of the food service plant and equipment comply with all applicable codes regardless of the type of contract used.

Doors

Receiving doors must be three and one-half feet wide to permit moving large equipment. All exterior doors in the dining area must open outward. Exit doors for students must be equipped with panic hardware. All exterior doors must be screened or provided with closers. Screen doors should be protected by bars or some other type of reinforcement. Air curtain fans may be necessary to prevent insects from entering the food center. Storeroom and cleaning closet doors should be louvered for ventilation.

Windows

In non-climate controlled buildings at least one half of all windows must be easily operable from the floor. Operable portions of windows must be screened with durable, rust-proof material in removable frames. Hazardous projecting corners in possible student travel paths must be avoided. Windows in the dining area should be located in coordination with seating plan, installed as near the ceiling as is structurally feasible, but low enough to provide ventilation at the seated level.

Kitchen windows should be located and sized for the sill to clear any proposed equipment and to provide good light and ventilation at the worker's level. Where practical, the manager's office should have an outside window. Sharply sloping interior window sills are recommended to prevent the accumulation of items.

Interior Finishes

Interior colors should be cheerful yet restful.

Walls should be washable to at least five-feet, four-inches above the floor in the dining areas and to their full height in the kitchen and serving areas. Washable materials may be glazed structural and ceramic tile, factory glazed concrete block, vitreous glaze or epoxy coatings on various materials, mildew resistant oil or rubber based enamels on very smooth surfaces and cement enamel.

Floors for dining areas should be vinyl asbestos tile, plastic tile, terrazzo or carpeting. Floor covering selections should be made with possible multi-uses and maintenance factors in mind.

Kitchen floors should be of quarry tile or terrazzo with abrasive finish. A cove base is required in all food service areas. Quarry tile base is recommended for all kitchen areas.

Proper acoustical treatment is required for dining, main kitchen and scullery ceilings. Acoustical ceilings for the kitchen and scullery should resist damage from moisture, grease and other such deposits.

Bulletin Boards

A large bulletin board should be included in all dining rooms, located so that students can see posted materials as they enter. A small (two-foot by three-foot) bulletin board is essential in the kitchen for posting menus, health cards, work schedules and other notices.

Drinking Fountains

An adequate supply of cool drinking water should be located near the exit but away from the serving line and dish return window.

Dish Return

The design of the dish return area should take into consideration whether or not the system employees or students will scrape dishes and trays or separate waste and silverware, the approximate number of trays being returned per time unit, the design of the dishwashing area and the type of dishwasher to be used and the traffic flow of both students and kitchen personnel.

Some arrangements feature two return windows and a single dishwasher located between them. Other return windows may be located in a vestibule between the dining area and scullery with doors opposite each other, allowing a smooth flow of students.

The number of scrape holes to be provided and their location depend upon whether students or system employees clean the trays, how many returns must be handled at a time, the type of garbage disposal and general arrangements of the scullery area.

The dish return window that opens directly to the dining area must close securely. A standard, solid core door three feet wide in a standard steel frame, permitting a 180 degree swing into the dining area, is best for most installations. The dish return window should be screened from the dining area.

The stainless steel dish return counter should run all the way across the scullery side of the doorway and be provided with a backsplash that is folded and extended to the floor on the dining side. The stainless steel front should be the width of the doorway and have a one-half inch minimum radius return to the scullery side of the doorstop, and should contain a chute for silverware to slide into a portable soak sink.

Other factors to consider are noise transmission and surface treatment of floor around dish return windows. Including a trash compactor in this area should also be considered.

Scullery Requirements

The general supply of hot water must be 140 degrees Fahrenheit, while the final rinse water must be 180 degrees Fahrenheit. These temperatures may be maintained either by a separate, two-temperature system or by a booster heater on the rinse line of the dish machines.

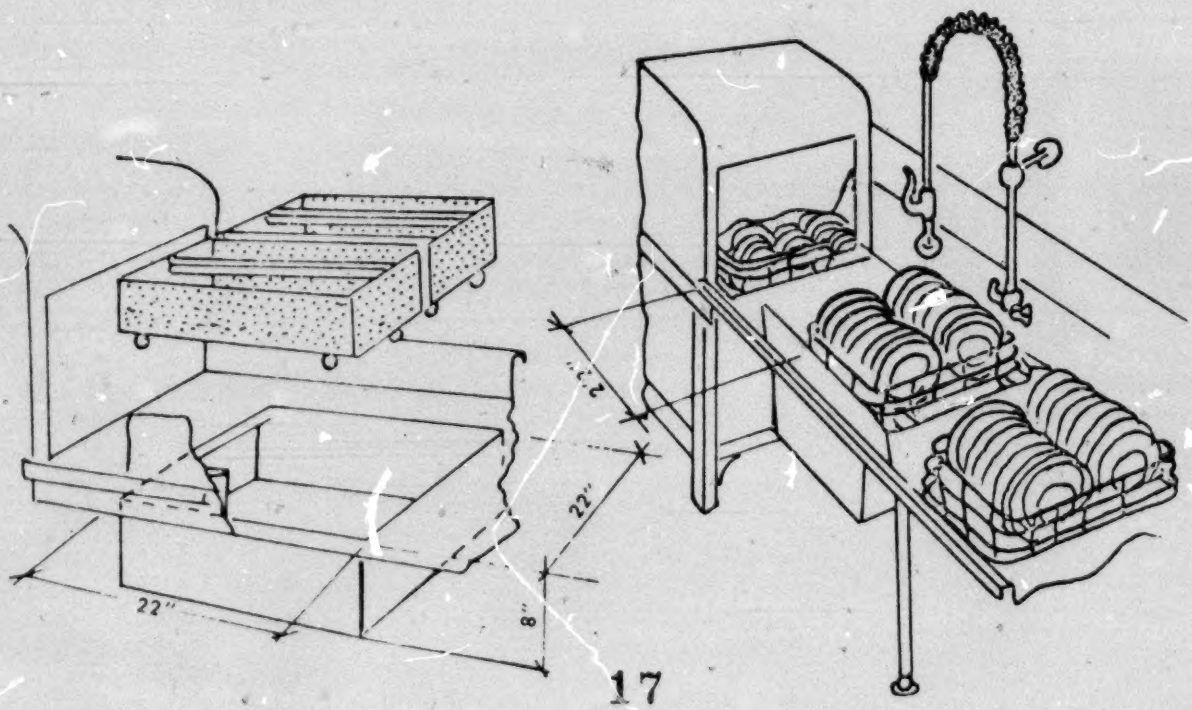
An eight kilowatt minimum electric immersion unit with thermostatic control and low water cut-off must be provided for hand dishwashing.

A hose bib equipped with a combination hot and cold mixing faucet and vacuum breaker must be provided in the scullery area.

Pre-rinsing must be provided for all dish, tray and pot washing facilities to remove excess waste from soiled dishes quickly and efficiently.

For hand washing tableware, a pre-flush sink should precede the wash compartments of the dishwashing sink and should be equipped with a removable, perforated basket for catching food scraps. An overhead swing faucet may also be used. For hand washing pots, pans and kitchenware, a 30-inch by 24-inch by 14-inch pre-flush sink must precede the wash compartment of the pot sink. (see illustration)

For machine dishwashing, a sink 22 inches square by eight inches deep should be equipped with an overhead, spring-action sprayer for pre-rinsing the dishes in the dish machine rack; a rack track; and perforated, removable baskets. This sink should be located two feet from the dish machine to provide space for one loaded rack of dishes. An eight-inch splash shield may be added along the front edge of the unit to protect the operator. (see illustration)



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For mechanical pre-rinse, most standard conveyor-type dishwashers can be ordered with a built-in pre rinse. This adds a maximum of two feet to the length of the machine. This is advantageous because the pre-rinse operation is completely automatic, it saves labor and the installation requires less floor space than a pre-rinse sink. The re-circulated pre-rinse is recommended for all conveyor-type dish machines. The re-circulated pre-wash is recommended in lieu of the fresh water pre-rinse.

Rinse Injector

Rinse injectors are now available for installation in the rinse line of dishwashing machines. Their function is to add a wetting agent to the rinse water and thereby eliminate the need for toweling glassware, silver, china or plastic dishes. The seemingly excessive installation cost will be saved in labor. Hand toweling is prohibited.

Electronic Detergent Dispenser

An electronic detergent dispenser is necessary to maintain the proper concentration of detergent in the wash water. Many of the problems associated with unclean utensils can be attributed to the lack of proper detergent concentration in the wash water. The dispensers are available through most detergent suppliers.

Lighting and Electrical Outlets

Lighting in food service areas must conform to the latest edition of *Lighting Standards for Georgia Public Schools,* which will be incorporated into a section of *Guide for Planning and Construction of School Facilities in Georgia.*

When determining light levels attention should be given to possible multi-use of dining area, location of switches and the location of outlets for portable equipment.

Floor Drains

Floor drains must be used in masonry type floors to permit cleaning with a hose. They should be located away from traffic and work aisles. Floor drains must be provided to receive condensation wastes from all refrigeration equipment, milk boxes, serving counters, vegetable peelers, steam equipment, dishwashing area and refuse area.

The floor should slope to floor drain at the rate of one-quarter inch every 10 feet for proper drainage and ease of leveling equipment.

Mechanical Ventilation

Hoods and exhaust fans over cooking equipment are needed to eliminate grease vapors and steam. Greater economy may be realized by grouping cooking equipment under one hood. Hoods should be enclosed with furring to prevent dust accumulation.

Vented hoods should extend nine to 12 inches beyond the length and width of ranges, ovens and steam equipment. This equipment should be approximately six and one-half feet above the finished floor level for head clearance, and be a minimum of two feet high to trap bursts of smoke and steam until the exhaust system can evacuate the vapors.

Removable and washable grease filters should be installed in the hoods at a 45 degree angle. Grease drip pans must be provided under filter assembly and should be readily removable and easily cleaned.

Exhaust capacity of the hoods should be 100 cubic feet per minute per square foot of hood cross sectional area. Therefore, a four-foot by nine-foot range hood would require an exhaust fan to handle 3,600 cfm. The area of the exhaust duct would be two square feet, or 3,600 cfm divided by the exhaust duct velocity of 1,800 feet-per-minute.

Exhaust fans should be mounted to minimize vibration. Dishroom areas should be adequately ventilated to eliminate condensation and aid in drying dishes, as well as to maintain comfortable working conditions. Provisions must be made for adequate make-up air.

Dishwasher hoods with split ducts to the two ends of the dish machine are recommended as superior to other types of heat and moisture removal.

EQUIPMENT

Equipment Placement and Use

Kitchen equipment must be arranged in logical order by work areas. Various areas may combine or overlap, depending on the size of the department. Convenient grouping within each work area is also important.

Range and/or steam cooking equipment and the cook's table should be convenient to the vegetable sink, refrigerator and the hot foods section of the serving counter.

Vegetable sinks should be convenient to the refrigerator, cooking and point of delivery.

The baking area should consist of oven, mixer and baker's table with portable bins and cooling rack, and should be near the cooking area, pot sink and refrigerator.

Refrigeration should be close to delivery entrance, vegetable and salad preparation, cook's table, baker's table and serving counter.

If only one mixer is available and is used by baker and others, it should be conveniently located.

It is usually best to arrange cooking equipment perpendicular to the serving counter. A right to left direction of work is usually more convenient than left to right. This is good because the dish return window then falls on the right of the dishwashing apparatus, the vegetable preparation sink to the right of the vegetable preparation area and the soaking compartment at the right end of the pot-washing sink.

Refrigerators, ranges, ovens and steam equipment should be placed away from walls to allow cleaning. Installing cooking equipment in a central location will greatly aid cleaning and increase kitchen efficiency.

Ranges and ovens should be on a fire-proof floor, while steamers and steam-jacketed kettles should be in a depressed or curbed area with floor drains. Special construction is needed for vegetable cutter mixer. Installation drawings are available from the manufacturer.

In selecting equipment, modular sizing should be considered. For example, baker's cooling racks, refrigerators equipped with slides, frequently referred to as food files, instead of shelves under

counter and other storage units are available for use with standard small equipment. Each shelf position of the food file, spaced on approximately three-inch centers, will hold one 18-inch by 26-inch bun pan, two 18-inch by 14-inch trays and 18-inch baking pans and serving counter insets.

The extensive use of 18-inch by 26-inch pans in school food service facilities dictates the selection of oven equipment large enough to accommodate these pans. The 30-inch soaking compartment should also be big enough to wash them.

Steam Equipment

When a meal load of 300 or more is anticipated, every effort should be made to provide steam equipment. Steam-jacketed kettles insure easy preparation of soups, vegetables, meats, cereal products, sauces and puddings. They provide quick cooling and eliminate the dangers of handling hot liquids in heavy stock pots. Steam cooking foods minimizes shrinkage, cooking time, loss of nutritive value and prevents burning.

Portable Equipment

Receiving, preparation, holding and serving equipment such as scales, carts, utensil racks, storage bins, shelving, chopping and slicing machines, cooling racks, proofing cabinets, mixers, serving counter units, soaking sinks, vegetable peelers and small work tables should be on ball-bearing and swivel wheels whenever possible. Portable kitchen machines should have retractable legs or a wheel locking device.

The advantages of mobile equipment include greater flexibility in arrangement and use, ease in cleaning both the equipment and the space under and around it and economy of effort and time, resulting in financial economy.

It is important to plan storage space at the point of greatest equipment use. There should be room for each piece of mobile equipment and for adequate space in the aisles. Normally a four-foot aisle is adequate. Entrance, storeroom and walk-in doors need to be wide enough (at least three and one-half feet) for mobile equipment.

Large Equipment List

The following list of standard food service equipment items is furnished as a guide for selecting equipment and determining space requirements. This list may not contain all new laborsaving devices that are constantly being introduced.

School plant services and school food services state staff are available to system personnel and/or their design consultants for assistance in selecting food service equipment.

Requirements for equipment and the installation are covered in a booklet published by the Georgia Department of Public Health (now Department of Human Resources), entitled *Rules and Regulations for Food Service,* February 12, 1967, chapter 270-5-6.

LARGE EQUIPMENT LIST

Item	Number of lunches served daily	Description and number and type of equipment
Bakery racks		Needed in all departments. Number needed is determined by storage and work space. 26 inches deep, in multiples of 20 inches.
Bulletin board		Should be approximately two feet by four feet and used for posting menus, work schedules, miscellaneous notices, health cards and sanitation reports.
Clock		Should be installed for best visibility.
Food cutters	250 and over	Electric table model. A food cutter is not required if school has a vertical cutter/mixer.
Dish bins		Portable dish trucks should be used under the serving counter in place of fixed shelving. These are loaded in the dishwashing area and used at the serving counter without rehandling dishes.
Dish machine	Up to 500	Should be single tank, automatic door type, 30 inches by 27 inches, with at least a 7.5-kilowatt heater in wash tank. Installation must ensure an adequate hot water supply. Requires 12-kilowatt minimum booster heater.
	500-1,000	Should be single tank, automatic rack conveyor type, 36 inches by 44 inches, with inspection door and a minimum of two 10-kilowatt heaters in wash tank. Installation must assure an adequate hot water supply. Requires 54-kilowatt booster heater.
	1,000-2,000	Should be double tank, automatic rack conveyor type, 60 inches by 30 inches with inspection door. Must have at least a 10-kilowatt heater in the wash tank and a 20-kilowatt heater in the power rinse. Installation must ensure an adequate hot water supply. Requires 54-kilowatt booster heater. NOTE: 1. Provide 180 degree Fahrenheit water supply for 100 percent dish rinsing effectiveness. 2. Where flow pressure of rinse water exceeds 25 pounds, a pressure regulator should be installed.

Item	Number of lunches served daily	Description and number and type of equipment
		3. For mechanical pre-wash, add 22 inches to 36 inches to the length of the dish machine, depending on type and model. 4. A recirculating pre-wash on all conveyor type dish washers should be used in lieu of a pre-rinse sink.
Clean dish table	Up to 300	Eight feet by 24 to 30 inches
	300-600	10 feet by 24 to 30 inches
	600-1,000	12 feet by 24 to 30 inches
	1,000-2,000	14 feet by 24 to 30 inches Ample space should be provided for air-drying dishes in dish machine racks. Drying time is shortened by adequate hot water supply and the use of a rinse injector. There should be room for three racks out of the machine in a line. The base should be open for portable dish carts.
Soiled dish table	Up to 300	Eight feet by 24 to 30 inches with 10-inch scrap holes as needed.
	300-600	10 feet by 24 to 30 inches with 10-inch scrap holes as needed.
	600-1,000	12 feet by 24 to 30 inches with 10-inch scrap holes as needed.
	1,000-2,000	14 feet by 24 to 30 inches with 10-inch scrap holes as needed.
Dollies		Needed in all departments for milk crates, food storage cans and garbage cans.
Pot filler		A swing faucet or a flexible attachment to supply water for the steam-jacketed kettles and stock pots used on range is a convenience. It should provide hot water and be about 18 inches above the range and kettle tops.
Fire extinguisher	Up to 300	Carbon dioxide five to 15 pounds – size one or two
	300-600	Carbon dioxide five to 15 pounds – size two

Item	Number of lunches served daily	Description and number and type of equipment
	600-1,000	Carbon dioxide five to 15 pounds – size two or three
	1,000-2,000	Carbon dioxide five to 15 pounds – size three or four
Freezer	Up to 300	50 cubic feet
	300-600	50 to 100 cubic feet plus approximately ¼ square foot of walk-in freezer space per meal served.
	600-1,000	100 to 175 cubic feet plus approximately ¼ square foot of walk-in freezer space per meal served.
	1,000-2,000	175 to 350 cubic feet plus approximately ¼ square foot of walk-in freezer space per meal served.
		1/3 to ¼ square foot net capacity per meal needed, depending on deliveries and commodities. This is in addition to freezer space and milk refrigeration.
		Note: The walk-in freezer should be constructed at the same elevation as the floor of the kitchen.
Garbage disposal unit		May or may not include a grease trap, depending on local health department requirements.
Lavatory		At least one required in all kitchens. Must include hot and cold water mixing faucet and towel and soap dispensers. Locate one near bake area.
Mixers	Up to 350	30-quart with dough hook and without vegetable attachments
	350-600	60-quart with dough hook, without vegetable attachments, but with dollie and two stainless steel bowls.
	600 and over	60-quart with dough hook, without vegetable attachments, but with dollie and three stainless steel bowls.
		OR

Item	Number of lunches served daily	Description and number and type of equipment
Vertical cutter mixers	450-1,000	40-quart is recommended
	1,000 and over	Schools serving 1,000 meals or more can effectively use both a 60-quart mixer and a 40-quart vertical cutter mixer.
Mixer attachments		Chopper, shredder, slicer and grater attachments for mixers are not recommended.
Convection ovens	250-400	One single-stack
	400-600	One double-stack
	600-1,000	One double-stack and one single-stack
	1,000-1,500	Two double-stack
Portable items		Floor space should be planned for storing these items at the point of greatest use.
Portable tables		Two feet by four feet, or same height as range and serving counter. Useful in conjunction with range, oven, steam equipment, mixer, slicer. Also provides useful transportation within the kitchen or to the serving counter.
Ranges	Up to 2,000	One heavy duty, uniform heat top with additional rack. Expando unit may be provided where half of a range is needed for limited surface cooking in conjunction with steam equipment. Note: Steam cooking equipment is recommended instead of a battery of ranges.
Refrigerator	Up to 300	50 cubic feet
	300-600	50 to 100 cubic feet plus approximately ¼ square foot of walk-in refrigeration per meal served.
	600-1,000	100 to 175 cubic feet plus approximately ¼ square foot of walk-in refrigeration per meal served.
	1,000-2,000	175 to 350 cubic feet plus approximately ¼ square foot of walk-in refrigeration per meal served.

Item	Number of lunches served daily	Description and number and type of equipment
		Note: Walk-in refrigerators should be constructed at the same elevation as the floor of the kitchen. 1/3 to ¼ cubic foot net capacity per meal needed, depending on deliveries and commodities. This is in addition to freezer space and milk refrigeration.
Milk refrigeration		Milk refrigeration should be provided in addition to regular refrigeration at approximately one cubic foot for 50 half pints of milk. This unit should be a separate unit in the serving line.
Scales		Platform scales are needed in every receiving area. Baker's scales are needed in the preparation area.
Serving counter	Up to 600	One counter 16 inches long by 24 to 30 inches wide, including refrigerated milk service, dish storage under counter and tray rail.
	600-1,000	Two counters 16 inches long by 24 to 30 inches wide, including refrigerated milk service, dish storage under counter and tray rail.
	1,000-2,000	Three counters 16 inches long by 24 to 30 inches wide, including refrigerated milk service, dish storage under counter and tray rail.
Sneeze guard		Required on all counters for food protection. In elementary schools the sneeze guard must cover the entire hot food section and all but 18 inches of the cold food section. In high schools, the entire hot and cold section of the counter must be protected.
Tray rail		Rails should be the length of the counter and 12 inches wide. The closed type with inverted V-ridges is preferred. It is recommended that the tray rail be dropped in front of the milk box so students can reach the milk. This is especially necessary in elementary schools. Note: Tray rails should be omitted if food service personnel serves the trays. Serving

Item	Number of lunches served daily	Description and number and type of equipment
		counters should be portable units. The number of counters needed depends on dining room size, but in general, provide one counter for every 200 to 250 dining room seats. High schools and junior high schools serving 500 or more should have two serving counters.
Dishwashing and/or pot sink		Should be NSF 14-gauge s/s type 302, four compartment sink, 30 inches by 24 inches by 14 inches with two 30-inch drainboards.
Sink booster heater		Should be at least a nine to 10-kilowatt immersion heater for a four compartment sink. The heater should not take up any of the effective depth of the sink. It should be covered with removable protective covering and have a low water cut-off.
Pre-wash sinks		Needed for all dishwashing arrangements, including hand dishwashing and pot washing. If dishwashing machine does not have a built-in pre-wash, a 22 inch by eight inch sink equipped with an overhead spring action spray for pre-rinsing dishes in the dish rack must be provided.
Sink splash shield		A splash shield should be used in front of all pre-rinse sinks.
Vegetable sink		Should be NSF 14-gauge type 302, two-compartment vegetable sink. Each compartment should measure 24 inches by 24 inches by 12 inches, with at least one 30 by 24-inch drainboard.
Service sink		Required in all kitchens.
Food slicer	250-1,000*	Electric (manually operated)
	1,000-1,500*	Electric (automatic) *High schools serving 500 or more and preparing large quantities of sliced foods should consider purchasing an automatic food slicer.
Soap dispenser		Should be located by all hand sinks.

Item	Number of lunches served daily	Description and number and type of equipment
Steamers	100-300	One compartment
	300-600	Two compartment
	600-1,500	Three compartment
Steam-jacketed kettle	300-450	One 40-gallon kettle
	450-750	One 60-gallon kettle
	750-1,000	One 60-gallon kettle or two 40-gallon kettles
	1,000-1,250	One 60-gallon kettle and one 40-gallon kettle
		Note: Choice menus may require that kettle size be altered.
Tables		Four lineal feet of work table space should be provided for each food production employee. Adjustable table legs are recommended, as are stainless steel tops.
Baker's table	Up to 600	Six feet by eight feet by 30 inches, 34 inches to 36 inches high. Base should be open for storing portable bins.
	600-1,000	Eight feet by 30 inches, 34 inches to 36 inches high. Base should be open for storing portable bins.
	1,000-2,000	Two tables six to eight feet long by 30 inches wide, 34 inches to 36 inches high. Base should be open for storing portable bins.
Cook table	Up to 600	Six to eight feet by 30 inches, 34 to 36 inches high. May have a utensil rack over, a shelf under and two drawers.
	600-1,000	Two tables six to eight feet long by 30 inches wide, 34 to 36 inches high. May have a utensil rack over, a shelf under and two drawers. One may have a 15-inch by 15-inch by 10-inch sink installed in it. It should be portable, with four-inch by six-inch casters.

Item	Number of lunches served daily	Description and number and type of equipment
	1,000-2,000	Three tables six to eight feet long by 30 inches wide, 34 to 36 inches high. May have a utensil rack over, a shelf under and two drawers. One may have a 15-inch by 15-inch by 10-inch sink installed in it. This table should have two locking casters.
Preparation table	Up to 600	Six to eight feet by 30 inches, 34 to 36 inches high, with shelf under and two drawers.
	600-1,000	Two tables six to eight feet long by 30 inches wide, 34 to 36 inches high, with shelf under and two drawers.
	1,000-2,000	Three tables six to eight feet long by 30 inches wide, 34 to 36 inches high, with shelf under and two drawers.
Receiving table		May be provided near receiving entrance or in storeroom to handle incoming goods. It should be six feet long and 30 inches wide.
Towel dispenser		Should be by all hand sinks.
Utensil racks		Used for transporting and storing pots and pans. Racks should be 48 to 60 inches by 26 inches.
Utility trucks		Useful for transporting raw and prepared food, as well as soiled and clean dishes. Number needed is determined by local needs. Trucks should be 24 inches by 40 inches with two shelves, 500 pound capacity.

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